

Presentation title: Corrosion Performance of Stainless Steels in a Simulated Launch Environment

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Abstract: At the Kennedy Space Center, NASA relies on stainless steel (SS) tubing to supply the gases and fluids required to launch the Space Shuttle. 300 series SS tubing has been used for decades but the highly corrosive environment at the launch pad has proven to be detrimental to these alloys. An upgrade with higher alloy content materials has become necessary in order to provide a safer and long lasting launch facility. In the effort to find the most suitable material to replace the existing AISI 304L SS (UNS S30403) and AISI 316L SS (UNS S31603) shuttle tubing, a study involving atmospheric exposure at the corrosion test site near the launch pads and electrochemical measurements is being conducted.

This paper presents the results of an investigation in which stainless steels of the 300 series, 304L, 316L, and AISI 317L SS (UNS S31703) as well as highly alloyed stainless steels 254-SMO (UNS S32154), AL-6XN (N08367) and AL29-4C (UNS S44735) were evaluated using direct current (DC) electrochemical techniques under conditions designed to simulate those found at the Space Shuttle Launch pad. The electrochemical results were compared to the atmospheric exposure data and evaluated for their ability to predict the long-term corrosion performance of the alloys.